The future of India's urbanization

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Abstract

In 2050, urban India will be home to fourteen per cent of the world's urban population. In less than thirty years, half of India's population will have to cope with urban life and there will be tremendous transformation of landscape, economic structure and social life. In order to forecast India's urban future, we assumed that secular and contemporary growth trajectories of all individual urban agglomerations are key drivers of future urbanization trends. We demonstrate that India's city-system conforms to the distributed growth model and that its hierarchical distribution is evolving regularly. India's plurisecular city-system fits well with the canonical model that describes universally the system dynamics. It shares common characteristics with several mature urban structures around the world. We show also that the location of the town has little influence on its growth trajectory. Nevertheless, individual trajectories can be classified, either by the secular trend of towns (1901-2011) or on the basis of the more recent genesis of the contemporary urban agglomerations landscape (1961 to 2011). These classifications are structured over time and space according to subsystems and regional specificities.

Introduction

More than half the world's population now lives in cities and the "urban transition" that began early in the ninetieth century will take less than a hundred years to complete. The developing countries, still in transition, are more populated than the developed countries where the transformation is complete since two or three decades. Today, two-thirds of all city-dwellers are found in less wealthy nations. While the tremendous surge towards urbanization in the twenty-first century may be broadly envisaged, it is necessary to provide for multiple local territorial expressions, especially for larger cities which are attracting lot of interest.
Simulation models, indispensable to predict the distribution of the urban growth, may be based on known dynamics to the extent that they are similar and they converge increasingly towards similar modalities, the similarity being explained by the networking of the cities around the world with globalization of interaction. We propose a method to predict the evolution of urban population that uses past trajectories of cities relative to the system they belong to. The Indian subcontinent makes a good case study as it is still less urbanised and has a long established and relatively reliable set up of statistical observation.

An earlier attempt shows that it is possible to estimate trends with reasonable accuracy. Davis' prediction in 1962 of the level of India's urbanization in the year 2000 is seen today to be quite successful in his estimate of urban population and its share of the total population of the country (Davis, 1962). His method was based on the classic hypothesis of universal linear stages in urban transition with a direct reference to the pattern in the USA, adjusted later by applying some logistic parameters. His estimate of India's total population (1 billion in 2000 for the medium estimate) is fairly accurate and the predicted urbanization rate of 30.8% for cities with 20,000 inhabitants or more is slightly higher than the official urbanization rate of 28% in the 2001 Census. However, his predictions for the biggest cities were extremely uncertain and he overestimated their populations. For instance, Davis expected between 9 and 32 million inhabitants for Madras (that has since been renamed as Chennai) and between 32 and 66 million for Calcutta, whereas in 2001, there were only 6.5 million and 13 million people in Chennai urban agglomeration (UA) and Kolkata UA respectively. Metropolitanization has been slower than predicted by Davis, more regional and intermediary cities, as well as smaller towns have emerged and forms of diffusion and concentrated dispersion have prevailed. India’s level of urbanization remains low (31% in 2011) as compared to China’s, for instance, where it is 50%. Residential migration toward cities does not contribute very much to urban growth and has not increased in thirty years (Sivaramakhrishnan et al., 2005; Chandrasekhar, 2010).

Nevertheless, one in ten city-dwellers of the world lives in India today. India's urban population is already enormous. The agglomeration process makes it potentially even bigger with 38% of India's population living in continuously built-up settlements with more than 10,000 inhabitants (Denis & Marius, 2011). This raises questions about the future expansion of Indian cities, especially its large metropolises after the next decades of potentially very high urban growth.

Projections of urban population for all countries and for a few large cities are available from several UN organization sources (UN, 2012). They have been criticized for overestimating urban growth, because they are based on linear inter-census growth rates, and because they do not take into account the major trend in the expression of “urban transition” (Bocquier, 2004)coined by W. Zelinsky (1973) –although they use a logistic curve model for predicting the evolution of total urban population. The more sophisticated population prediction methods that are conceived for national and local systems rely mainly on demographic methods including cohort-component, trend extrapolation, and structural models (Smith et al., 2002).The method that we propose here is both structural (rooted in the dynamics of co-evolution in urban systems) and extrapolation of trend and also includes reference to the stage in demographic transition. Its aim is to provide a more diversified view of the future evolution of individual cities. The large historical database required for this was constructed in collaboration with several agencies (Swerts, 2013).

The main difference between our approach and that Davis is that, (using a very detailed database incorporating all the urban settlements with their population from 1901 to 2011) we have projected the population of each city considered as a separate entity whereas Davis based his estimates on classes of towns except for the ten biggest metropolises, which he treated individually. UN-Habitat, UN Population Division, as well as World Bank still use city size classes to estimate future growth. Cities with “fewer than half a million inhabitants” or even with 750,000 have no individual existence in their databases. Demographers, who follow this method and ignore the disaggregated dynamics of the entire city-system, are usually not able to predict the spatial distribution of urban future and always tend to overestimate polarization toward “major metropolitan area”.

The two complementary geo-databases that we used are presented in section 1. In section 2, we describe, the current Indian system of cities. We examine the urbanization trend of the last century in section 3 and discern the genesis of the present spatial distribution. The earlier trajectories (since 1901) partly explain this genesis whereas the more recent ones (since 1961) constitute the reference for our prediction model in order to forecast the urbanization in 2050 (section 4). In section 5 we present the results of our projections based on the detailed knowledge of the existing system of cities and its earlier trajectories. Our predictions are finally compared with that of UN agencies and the future rate of urbanization is expound.

1 Harmonised data bases for the study of urbanization

The referential for our prediction exercise is composed of two complementary sets of data. Both are geo-databases incorporating the whole Indian system of cities.

The first, called *IndianCensus*, is based on the official towns as given by the census series since 1901. The current urban classification used in 2001 and 2011 includes: (a) all places with a municipality, corporation, cantonment board or notified town area committee, etc. irrespective of their demographic characteristics (called Statutory Town) and (b) all other places that satisfied the three following criteria: i) a minimum population of 5,000; ii) at least 75 per cent of the male working population engaged in non-agricultural professions; and iii) a density of population of at least 400 per sq. km (called Census Town). The last two criteria are based on the previous census (2001) for 2011 Census towns.

Many authors have underlined the problem of comparing over time and space the urban census data in India (Landy, 2002; Bhagat, 2005; Sivaramakrishnan et al., 2005; Ramachandran, 1989; Denis et al., 2011; Denis et al., 2012; Pradhan, 2012). They point out mainly the fuzziness of criteria that designate *Statutory Town* and *Census Town* as well as the lack of homogeneity in their application by different Indian States and from one census to the next since 1951.

The Indian Census database incorporates all the local units defined as urban by the Census administration from 1901 to 2001, and those that have been downgraded to the status of village for one or more decades between 1901 and 2001[1], but still depends on the change in the definition from Census to Census and its use from State to State. This database includes 3,545 cities of more than 10,000 inhabitants in 2001.

The second geo-database called *Indiapolis* is composed of 18,365 agglomerations with more than 5,000 inhabitants in 2001 regardless of their census or administrative status, whether urban or not. The existence and extent of physical agglomeration has been assessed and delineated using satellite imagery considering continuously built up areas with less than 200 meters between constructions. The total population of an agglomeration is thus the sum of the populations of all the census local units (towns and villages) falling within it. For all these agglomerations and their components, the census population has been collected since 1961. The population figures of 2011 consist of data provided by the census for towns with over 100,000 inhabitants and the estimates for each smaller unit included in the set of agglomerations. These estimates are based on the number of households given by the 2011 Census for each urban settlements and the average size of households in urban area of each district. All the physical agglomerations with at least 10,000 inhabitants are considered as urban. This set of cities is affranchised of administrative boundary. Indiapolis is part of a worldwide urban database, e-Geopolis, which uses the UN recommendations for the definition of a city (Moriconi, 1993).

Indiapolis database is based on a raw fact, the observed settlement agglomeration existing in the physical environment whereas official urban category is an institutional fact, the urban classification being an assigned function conferred by intentionality within the government apparatus. The Indiapolis urbanization rate determined from the urban agglomeration data described above is 10% higher than the official rate (Denis & Marius, 2011). It is certainly more suited to forecast the urbanization given the uncertainty of future urban-rural classification.

[1] This database is the product of François Moriconi-Ebrard, Sylvie Dubuc (1994), Joel Querci (2010) and Elfie Swerts (2013) successive works.

The approach chosen will permit to better envisage the future Indian city system, either when restricted to the urban governance territory or when considering the more "natural" and larger space of socio-economic investments that induce physical agglomeration.

The study of the evolution of the Indian system of cities in the twentieth century relies on a combination of two databases: *Indian Census* between 1901 and 1951 and *Indiapolis* from 1961 up to 2011.

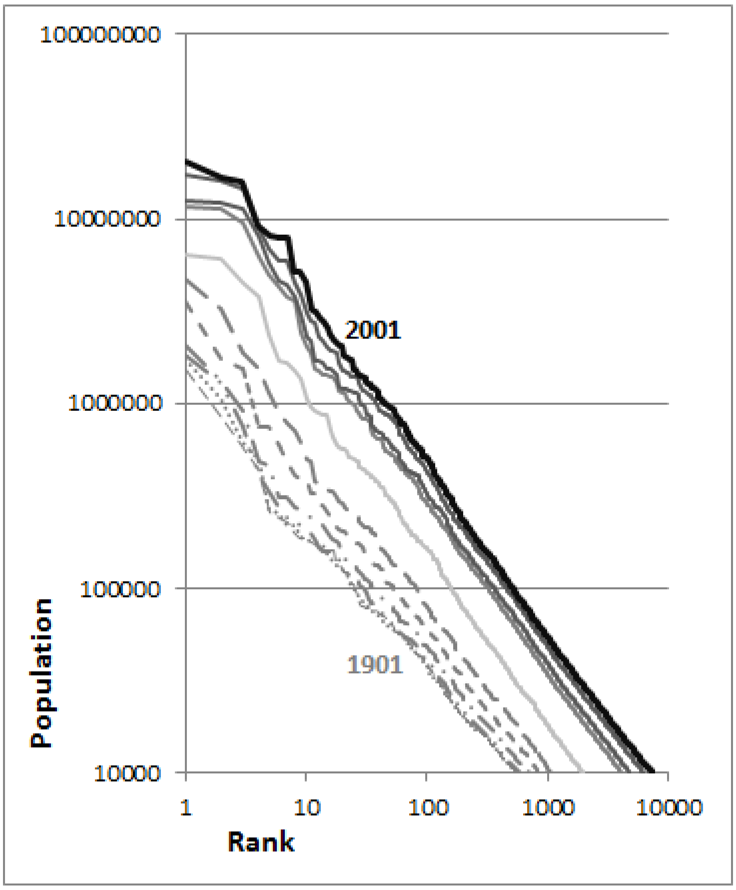
2 The structure of the Indian system of cities

Cities are strongly connected by material and non-material relationships and multiple spatial and social interactions that give rise to interdependence and complementarity among them. Hence they should not be considered as isolated entities, but as objects evolving together within systems defined by their interactions, at regional, national and global levels (Pumain, 1982 ; 1997 ; 2006)

Several studies (Moriconi-Ebrard, 1993, Bretagnolle et al., 2007; Pumain et al., 2013 Geodivercity) show that the dynamic processes in systems formed by cities in different regions of the world and the spatial organisation of these systems are universal. There exists a regular hierarchical distribution of city size (Zipf's law) that is the result of a process of distributed growth in which it is probable for all the cities to grow at the same rate in each time interval (Gibrat model). However, beyond the common structures and dynamics, the city-systems in various parts of the world present singularities resulting from their evolution in historical and political contexts that are sometimes very different. Thus identification of generic evolutionary mechanisms and processes peculiar to the Indian city-system should enable better prediction of its future evolution (Pumain, 1982; 1997; 2006; Bretagnolle et al., 2009).

The hierarchical distribution of Indian cities follows a rank-size rule, whichever be the period or demographic database considered (Sharma, 2003; Schaffar and Dimou, 2012; Swerts and Pumain, 2013).

<u>Figure 1. Rank-size rule: India 1901-2011</u>



Source: Combination of census data for the period 1901-1951 and Indiapolis data for 1961-2011

The rank-size rule, when applied to Indian cities as defined in the Census, and to morphological agglomerations as defined in Indiapolis, shows that the system of Indian cities is not strongly hierarchical, which is characteristic of regions urbanized long ago and in which small towns still survive (Denis et al., 2011). In 2001, the Indian slope is 0.89 with Indiapolis data. In 2011, this value remains the same and 0.99 with Indian Census data.

This slope is close to that observed in Europe (0.96 in 2000), also a region where urbanization is centuries old, and is in contrast to those observed in the USA (1.13) and South Africa (1.20) where urbanization is relatively recent[2] (Moriconi-Ebrard, 1993; Bretagnolle et al. 2007, 2009).

The singularity of the distribution of Indian cities is caused by the preponderance of three gigantic megalopolises: Delhi, Kolkata and Mumbai, of around 16 million people (Figure 1), and by the presence of a set of "secondary cities " with large populations compared to all other cities in the system: Thiruvananthapuram, Chennai, Hyderabad, Bangalore, Ahmadabad and Pune having populations of between 3 and 7 million in 2001 (Shaw, 1999; Landy, 2002)[3].

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[2] The comparison here is meaningful as it applies to a large number of urban entities that are similarly designed.

[3]The hierarchical order of these cities as well as their population has evolved: in 2011 they counted between 4.5 million and 9.5 million inhabitants, the largest is Hyderabad, followed by Thiruvananthapuram, Bangalore, Chennai, Kanpur, Pune and Ahmedabad.

This configuration, which emerged in the twentieth century (Figure 1), is the combined result of endogenous urbanization over several centuries (Delhi, Hyderabad and Ahmedabad) and the influence of the colonial period (Mumbai, Kolkata and Chennai, the gateways to India by sea) (Durand-Dastès, 2003).

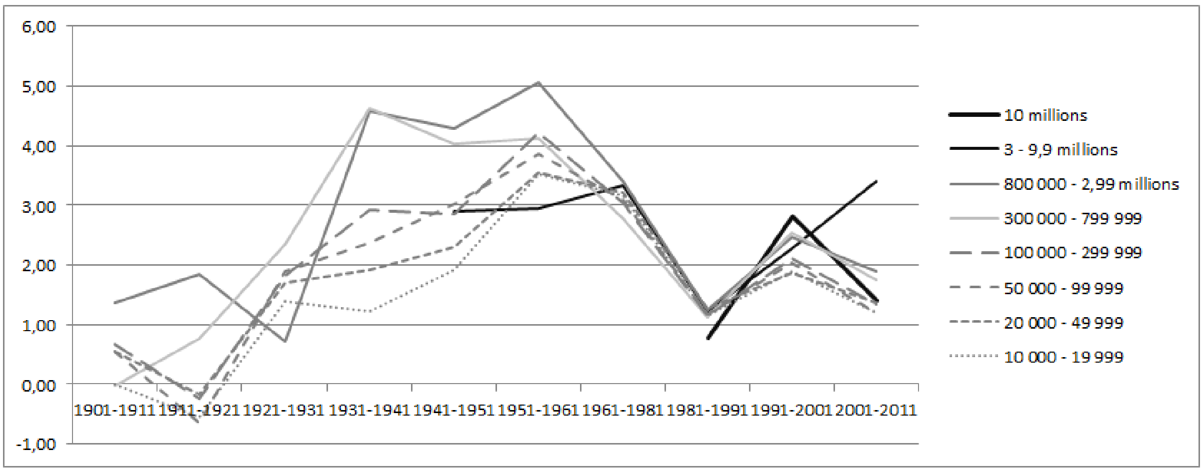
3 The century-long history of Indian urban hierarchy

Along with the emergence of the large Indian metropolises, the hierarchical organization of Indian cities has strengthened in favour of large cities first in the 1930s, marked by the onset of the demographic transition and the rural exodus (Landy, 2002) and then, mainly in the decade 1951-1961, after Independence, marked by the increased density of the Indian urban network.

This hierarchy has evolved at a regular pace over the last century, as shown by the rank-size graph (figure 1), even though the size distribution of Indian cities is not strongly hierarchical. The stability of the rank-size curve between 1901 and 2011 signifies that growth was distributed among all the cities of the system, regardless of their size, with a slight bias favouring the growth of large cities between 1931 and 1961. The Gibrat model is validated at the national as well as at the regional levels regardless of the period or database considered (Sharma, 2003; Schaffar and Dimou, 2009; Swerts and Pumain, 2013).

Despite this match with the stochastic model of "distributed growth", there are still differences in the rates of change when the cities are sorted into size classes (Figure 2), some of the variations being significant (Swerts and Pumain, 2013). However, from the year 1961 in the case of Indiapolis data and 1971 for Indian Census data, the rates of change of the urban population of all size classes are less differentiated (Figure 2). Moreover, since 1961, the rank-size curves show that hierarchical differentiation slows down considerably (Figure 1).

Figure 2: Growth by size class: 1901-2011

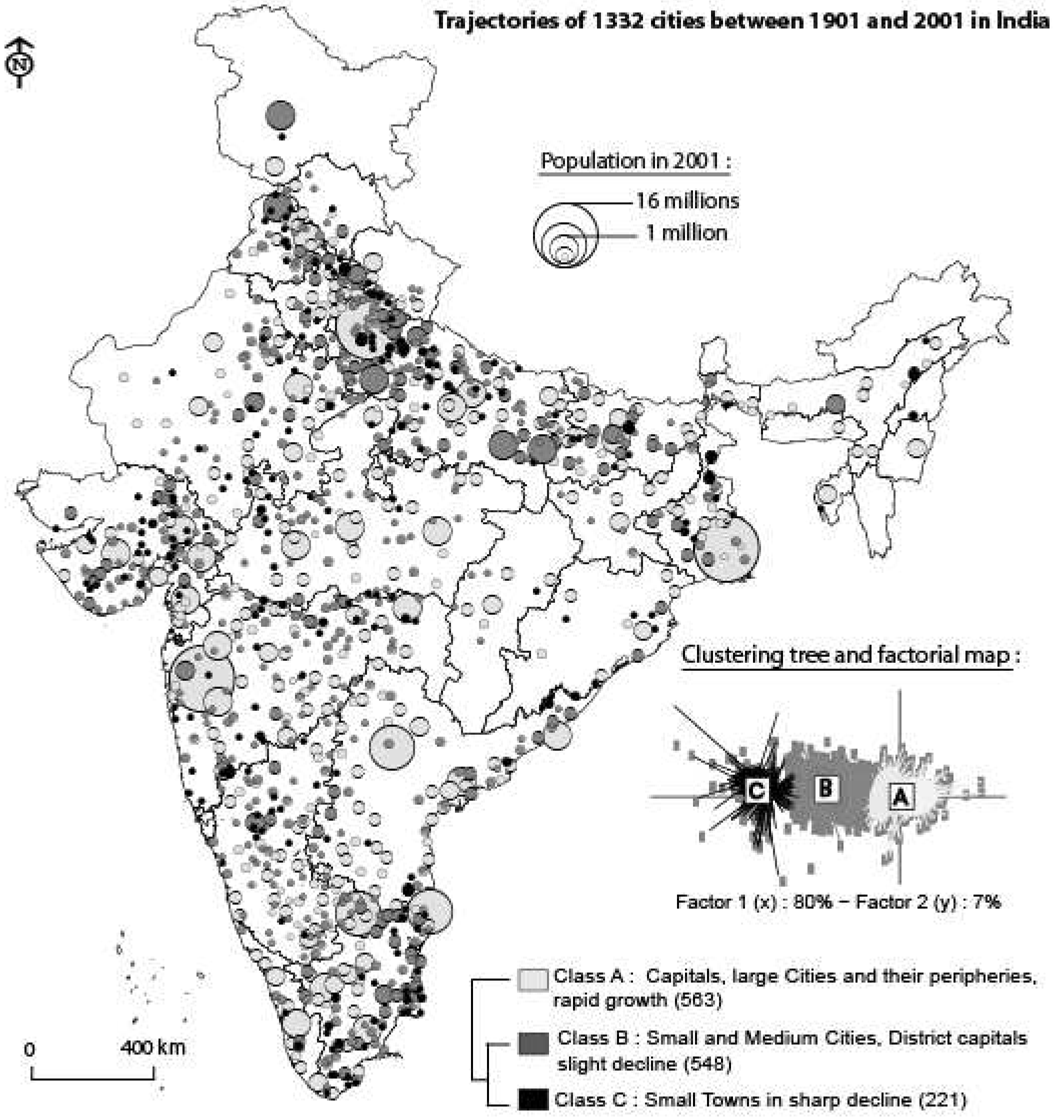


Source: Census data for the period 1901-1951 and Indiapolis data for the period 1961-2011.

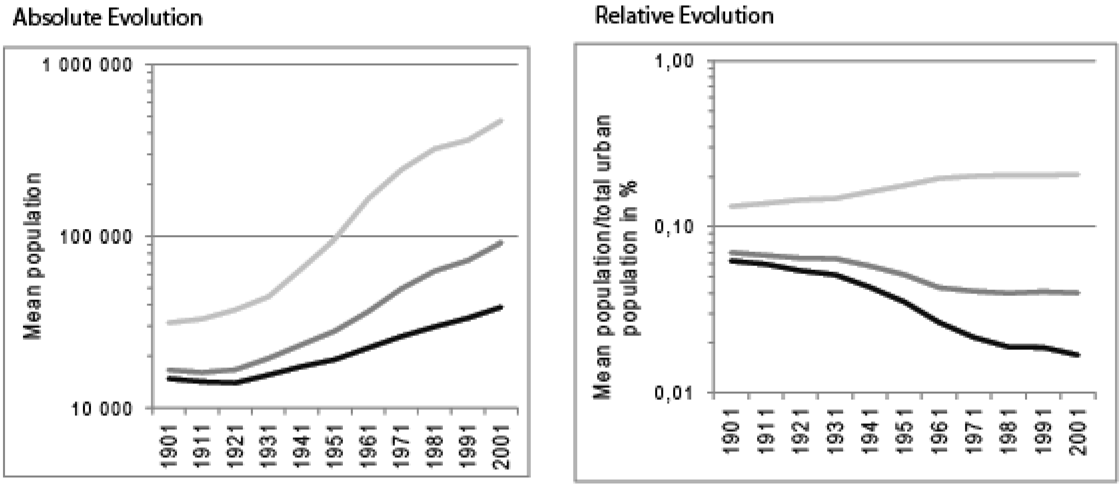
4 Secular and more recent trajectories of Indian cities

It must be recalled that, in a complex system (Bretagnolle et al., 2006), the structure of the urban system observed at a macro-geographic scale is produced by the multitude of individual evolutions of cities at micro-geographic scale. In order to establish this connection, we analyse the trajectories of Indian cities during the twentieth century, using a database that combines the census data for the period 1901-1951 and the Indiapolis data for the period 1961-2011[4]. Using ascending hierarchical classification obtained by Chi-square distance, which groups together cities with a similar evolution profile irrespective of city size, we identify six classes describing the population evolution of 1,163 cities for which data are available for the period 1901-2011. These trajectories are represented on Figure 3 by the curve of the average population of each class, using absolute population figures on the left side of the graph, (all curves are then upward due to the distributed growth) and relative figures on the right side, obtained by dividing the average population of the class by the total population of the city system at each date: the curves are then divergent, which helps to differentiate their evolution.

Figure 3: Trajectories of Indian cities for 1901-2011



[4]The significant increase of the slope of the rank-size curve between 1961 and 1971may be attributed to changes in the criteria that define towns from 1961onwards (Sivaramakrishnan et al., 2005)



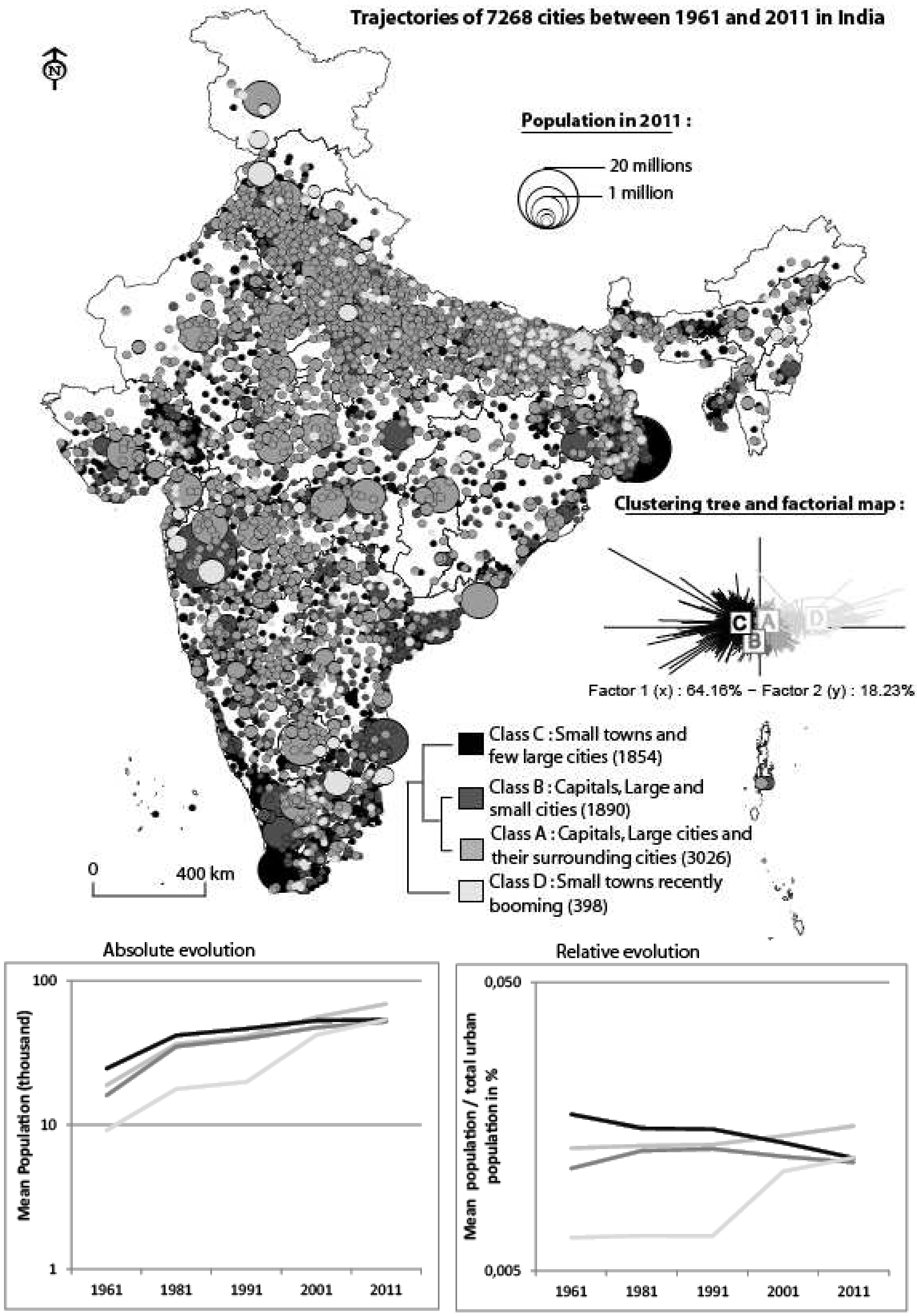
Source: census data for the period 1901-1951 and Indiapolis data for the period 1961-2011 (Software: Trajpop : Robin Cura, 2011)

The trajectories of Indian cities can be divided into two phases. The first that extends from 1901 to 1961 is a period of rapid urban growth in which the hierarchical organization of Indian cities favours large cities, which in terms of the trajectories results in an increased weight of biggest cities, and surrounding towns (class A) within the system. Meanwhile, the trajectories of cities in classes B and C are descending, a trend that is more marked in 1931 and 1951. From 1961, urban growth slows down, the rate of population growth by cities size class becomes uniform and the hierarchical organisation slows down considerably. Simultaneously, a phase of relatively stable trajectories of cities begins in 1961 for the cities of class A and B. However, we note that from 1991, the weight of the cities of class A increases slightly even as the trajectories of cities in class C take a new downturn.
It is in the region around Bangalore, in the "corridor" linking Hyderabad, Mumbai, Ahmedabad and Delhi, in North-West Delhi and on the south coast of Andhra-Pradesh, that the weight of the cities in the system has increased the most.

Finally, throughout the period, 42% of cities have seen their weight going up within the Indian system (class A), while 68% have experienced a relative decline. Indian urban growth thus seems to have been concentrated in a few large cities, spreading outward towards the surrounding towns although this trend seems to have diminished significantly from 1961.

The secular trajectories of Indian cities explain most of the actual features of the structure of the system of cities. However, in urban systems, the path dependence may be quite limited, particularly because some radical changes occurred in the spatial distribution of activities during the last decades. In order to improve the quality of projections, we need a more precise view of the recent evolution that may prepare the future dynamics during the next decades. The period must not be too short either, so as to avoid wide and usual random fluctuations of urban growth rates measured over simple census intervals. That is why we conducted a new analysis covering the period 1961 - 2011, on the evolution of 7,268 morphological agglomerations that have more than 10,000 inhabitants in 2011. They are assembled into five classes, on the same principles as those used for the analysis of city trajectories over the period 1901-2001. For this period, major inflections are seen in 1991.

Figure 4: Trajectories of Indian cities between 1961 and 2011



More than 45% of the cities have an overall upward relative trajectories (Classes A and D) and 25% (Class B) a stable trajectory between 1961 and 2011. Class D contains 398 cities (5.5% of the total number of cities) that are distinguished by their strong upward trajectory in 1991. Class D consists essentially of very small towns; towns with less than 25,000 inhabitants constitute 70% of it (against 65% of the entire dataset). It includes only 3 major cities with a population of over a million (Pune, Amritsar and Salem).

Apart from those in class D, cities with a population of less than 25,000 inhabitants are slightly under-represented in classes with ascending trajectories, especially in Class A (only 60%) and in contrast, slightly over-represented in classes with descending trajectories (class C). 75% of Cities with a population of over a million have an upward trend, as also the capital cities of states and districts. Among the cities with descending curves, we find Kolkata, large towns of Kerala and very old cities such as Madurai, Varanasi and Mysore. Finally, the location of a city has a smaller influence on its trajectory in the period 1961-2011 than in the twentieth century as a whole. However, the cities situated on the coast are generally less dynamic than those in the interior.

5 Projection method and results for the period2011-2050

The growth of urban population results from the growth of existing cities and the emergence of new ones. For projecting the population up to 2050 for cities with over 10,000 inhabitants in 2011, we determined the contribution of the growth rate of cities existing in 1961 to the growth of the total urban population between 1961 and 2011, and then we calculated the population of Indian cities using:

1) the same growth rate for all cities (proportional projection)
2) a growth rate proper to each class of cities identified by their trajectories between 1961 and 2011, ie the ratio between the average growth rates of cities in each class and the growth rate of the total urban population[5].

We then compare our results with those obtained by applying the growth rate predicted by the UN for the 65 largest cities in India over the period 2010-2025[6] (table 1).

Table 1: Population of the 20 largest cities in 2025 and 2050 according to proportional, segmented by 1961-2011 trajectories methods and UN projections

[5]For a better precision, we use a partition in 5 classes to work on the cities’ population projection.

[6]http://esa.un.org/unup/CD-ROM/Urban-Rural-Population.htm

Name	2011 (in million)	2025 (in million)			2050 (in million)	
		Proportional	Segmented by Trajectories	UN Projection	Proportional	Segmented by Trajectories
Delhi	20,2	25,8	27,0	25,5	36,8	41,0
Mumbai	16,5	21,2	21,0	20,9	30,2	29,7
Kolkata	15,7	20,2	18,7	20,0	28,8	24,0
Hyderabad	9,1	11,7	12,2	11,8	16,7	18,6
Thiruvananthapuram	8,1	10,4	9,6	10,8	14,8	12,3
Bangalore	7,9	10,2	10,6	10,2	14,5	16,2
Chennai	7,9	10,1	10,0	10,1	14,4	14,1
Kozhikode	5,5	7,1	6,6	7,4	10,1	8,4
Kanpur	5,2	6,7	7,0	6,8	9,5	10,6
Pune	5,2	6,7	7,7	6,8	9,5	13,3
Ahmadabad	4,5	5,8	5,4	5,8	8,2	6,9
Malappuram	4,2	5,4	5,0	-	7,7	6,4
Jaipur	3,1	4,0	4,2	4,1	5,7	6,4
Lucknow	2,9	3,7	3,9	3,8	5,3	5,9
Surat	2,8	3,6	3,7	3,6	5,1	5,7
Nagpur	2,6	3,3	3,4	3,4	4,7	5,2
Patna	2,4	3,1	2,9	3,2	4,4	3,7
Indore	2,2	2,8	2,9	2,9	4,0	4,5
Visakhapatnam	2,1	2,7	2,8	2,8	3,9	4,3
Kalyan-Dombivli	2,1	2,7	2,5	-	3,8	3,2

5.1 Application of the same growth rate

If we apply the same growth rate to all Indian cities over the period 2011-2050, the hierarchical distribution pattern is preserved. Delhi, Mumbai and Kolkata dominate the Indian system, with populations of 37, 30 and 29 million respectively. The macrocephaly index value between the third city (Kolkata) and the fourth largest city (Hyderabad) changes from 2 in 2011 and 2025 to 1.72 in 2050 (Table 1).

These largest metropolises are followed by secondary metropolises, Hyderabad, Thiruvanantapuram, Chennai and Bangalore, with populations of 14-16 million in 2050. The hierarchical distribution coefficient (rank-size slope), meanwhile, remains unaltered between 2011 and 2050 (0, 89) (Table 1).

5.2 Application of the growth rates segmented according to 1961-2011 trajectories

Application of growth rates differentiated according to type (above growth rate weighted with the ratio of trajectory class growth rate to that for all Indian cities in the period 1961-2011), yields results that are different from those obtained earlier, especially for cities at the top of the hierarchy, which itself becomes more regular. The sizes of the three major cities Delhi, Mumbai and Kolkata diverge with populations of 42, 32 and 26 million respectively. The gap between these three major cities and secondary metropolises decreases significantly, the ratio between the populations of the third city (Kolkata) and the fourth largest city (Hyderabad) being only 1.35. However, a slight break in slope occurs between the 9th city (Pune) and 10th

(Ahmedabad). Overall, the hierarchical distribution coefficient changes very little from 0.89 in 2011 to 0.90 in 2050.

When comparing population projections obtained with this method of segmented growth rates and those resulting from an identical growth rate for all Indian cities, significant differences appear at the top of the hierarchy and for cities with more than one million inhabitants. The rank-size curve obtained with the projections based on the trajectory class growth rate is more regular than that obtained with an identical growth rate (Table 1). While the three largest metropolises follow more individualised paths each benefitting from its own earlier evolution, secondary metropolises are catching up with them, reducing the gap between the two groups at the top of the hierarchy.

5.3 Comparison with UN projections

Besides projecting the total urban Indian population until 2050, the UN in its “World Urbanization Prospects 2011 Revision”, establishes population figures and growth rates from 2009 until 2025 only for cities with more than 750,000 inhabitants. Because of its focus on the growth of big cities, UN has a tendency to underestimate the expansion of the whole city-system. UN’s projections are very close to those obtained when we apply the same growth rate to all cities.

It forecasts an urbanization rate in India of only 51.7% in 2050, while we obtain 55.9%. Diffusion of growth within the city-system and its expansion appear under estimated by UN's method. We predict more than 925 million Indians living in urban agglomerations in 2050 (Table 2); it is equivalent to the India’s entire population in 1993.The urban population will at least double in 2050 from its value in 2011.

The major socio-economic challenge confronting the Indian government would be to generate the infrastructure needed to accommodate about 484 million additional urban dwellers. In 2001, the urban population occupied 54,366 km^2 of continuous built up area which was already one of the densest urban environments in the world with 8,100 inhabitants per square kilometre. The cities will necessarily claim a larger share of the land for expansion until 2050 even if the regulation on Floor Space Index (FSI) is relaxed.

Table 2: Expected populations and urbanization rates until 2050 and their distribution by city size class (growth rates segmented according to the trajectories of the period 1961-2011)

Total population	**2011**	**2020**	**2030**	**2040**	**2050**
Million Plus city	162,154,902	195,679,157	241,116,721	297,105,090	365,804,054
> 100,000	117,230,548	135,593,267	159,388,646	187,359,896	220,286,787
100,000 to 10,000	161,759,123	206,574,357	258,347,048	306,938,489	339,174,153
Total urban	441,144,573	537,846,781	658,852,416	791,403,475	925,264,993
Total India	1,210,193,422	1,326,093,000	1,460,743,000	1,571,715,000	1,656,554,000
Rate of urbanization	36.5	40.6	45.1	50.4	55.9
In %					
Million Plus city	36.8	36.4	36.6	37.5	39.5
> 100,000	26.6	25.2	24.2	23.7	23.8
100,000 to 10,000	36.7	38.4	39.2	38.8	36.7
Total urban	100.0	100.0	100.0	100.0	100.0

In 2050, the number of Million Plus agglomerations will be 89, double the number in 2011. Numerous towns with less than 100,000 inhabitants will accommodate 339 million people in all. In a complementary development, India's city-system will continue to expand with the emergence of new agglomerations and the growth of its largest cities.

Conclusion

In order to forecast India's urban future, we assumed that secular and contemporary growth trajectories of all individual urban agglomerations are key drivers of future urbanization trends.
Our projection is firmly grounded on two diachronic databases, and takes into account the individual trajectories of all the urban agglomerations existing in 2011 and the new agglomerations likely to emerge until 2050.
We demonstrated that India's city-system conforms to the distributed growth model and that its hierarchical distribution is evolving regularly. As seen in the rank-size distribution over successive periods of time, growth of towns and urban agglomerations has been always well distributed, for more than a century. India's plurisecular city-system fits well with the canonical model that describes universally the system dynamics and shares common characteristics with several mature urban structures around the world. We have also shown that the location of the town has little influence on its growth trajectory. Individual trajectories can be classified, without the loss of too much information, either by the secular trend of towns (1901-2011) or on the basis of the more recent genesis of the contemporary urban agglomerations landscape (1961 to 2011). These classifications are structured over time and space according to subsystems and regional specificities (for instance, inland cities are growing faster than coastal towns).
In less than thirty years, half of India's population will have to cope with urban life and there will be tremendous transformation of landscape, economic structure and social life. Development of infrastructure in keeping with the pace of demographic urban growth is a major concern for India. In 2050, urban India will be home to almost fourteen per cent of the world's urban population. The sustainability of India's city-system has thus already become a global challenge as well.

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